



Linking the runoff response at micro-plot and catchment scale following wildfire and terracing, north-central Portugal

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Wildfires are known as one of the principal natural hazards affecting the Mediterranean region. This includes Portugal, where wildfires have affected some 100.000 ha of rural lands each year.

The effects of wildfires on runoff generation and/or the associated soil (fertility) losses have been studied in Portugal for more than two decades. Some of these studies have reported strong and sometimes extreme hydrological responses in recently burnt areas. Forestry operations in such areas have increasingly come to include bench terracing in preparation of new eucalypt plantations. The hydrological impacts of bench terracing, however, have received little research attention so far and the few existing publications are limited to small spatial scales.

The construction of terraces is commonly considered an effective practice for soil conservation on steep slopes, having been applied by mankind since early history. Nonetheless, the present authors have measured high rates of splash as well as inter-rill erosion on recently constructed terraces, and have regularly observed rill formation, including on forest tracks which typically constitute an extensive network in such bench terraced plantations.

The present study was carried out in a 29-ha forest catchment in north-central Portugal that was burnt by a wildfire during the summer of 2010, logged during early winter 2010/11, and then bench terraced with bulldozers during late winter 2011, some 6 months after the wildfire. The catchment outlet was instrumented immediately after the fire with an automatic hydrometric station comprising two subsequent flumes with maximum discharge capacities of 120 and 1700 l sec⁻¹. Within the catchment, rainfall was measured using several automatic and storage gauges and overland flow was monitored on two contrasting slopes using 3 micro-plots of approximately 0.25m² on each slope. Overland flow was measured at 1- to 2-weekly intervals during the hydrological years of 2010/11 and 2011/12, i.e. during the first six months after the wildfire but before the bench terracing and during the subsequent 18 months.

While data analysis is still ongoing, preliminary results suggested that bench terracing had a greater impact on runoff generation than the wildfire itself, especially at the micro-plot scale